METHOD FOR COLLECTING NETWORK USAGE DATA OF A USER

Field of the Invention

The present invention relates to a method for collecting network usage data for a user, which belongs to the technical field of computer network.

Background of the Invention

As Internet evolves increasingly, users of Intranet, Internet Service Provider (hereinafter referred to as ISP) and broadband networks grow rapidly, categories of network service are becoming profuse, and network usage is diversified gradually. In such a case, operators and managers of network services demand to master user's usage of network resources in detail so as to implement more flexible accounting, plan reasonably and manage and monitor network resources effectively.

How to obtain user network usage data in an efficient, accurate, and real-time manner? Presently, a typical solution is to configure a monitoring server, which collects the data related with address, port, and traffic in Internet Protocol (hereinafter referred to as IP) messages forwarded via routers and, on that basis, performs statistics and analysis to obtain network usage data of users. The flow is shown in Fig.1.

Though detailed network usage data can be obtained by using a monitoring server, that method has the following disadvantages:

1. The method requires an additional high-performance server; since the data volume to be collected is vast, thus support of mass storage devices is required, which increases networking cost.

2. The method can collect only network resource occupation data

such as IP address and port number, but is unable to determine the users who occupy the network resources. To support applications such as content accounting, further process is required.

3. The method is poor in real-time feature and thus can't meet the demand of real-time applications such as real-time accounting and real-time monitoring.

Summary of the Invention

An object of the present invention is to provide a method for collecting network usage data of a user, which uses association between NetStream technology and Remote Authentication Dial-In User Service (hereinafter referred to as Radius) Protocol to achieve efficient and real-time collection of network usage data of the user and provide essential data for network usage-based management and accounting.

The method for collecting network usage data of a user according to the present invention comprises the following steps:

(1). an access device authenticating and authorizing the user, and an Authentication, Authorization and Accounting Server (hereinafter referred to as AAA server) recording the user's network resource information authenticated and authorized;

(2). a router, during network access, recording network usage information, and sending the network usage information to a NetStream Collector (hereinafter referred to as NSC) with User Datagram Protocol (hereinafter referred to as UDP) messages;

(3). the NSC aggregating the collected network usage information;

(4). the association analysis server performing real-time association analysis for the aggregated network usage information and the user's network resource information uploaded from the AAA

server to obtain detailed network usage data of the user.

The access device in the method is any one of LAN switch, access server, or IP phone gateway.

Step (1) in which an access device authenticates and authorizes the user and an AAA server records the user's network resource information comprises the following steps:

(1). the access device sending the user's authentication and authorization data to the AAA server;

(2). the AAA server analyzing and recording the user's authentication and authorization data, and sending the control information of network access permission to the access device;

(3). the access device allocating resources to the user and sending the user's network resource information to the AAA server, which records the user's network resource information;

(4). the AAA server forwarding the user's network resource information to the association analysis server in real time.

Wherein, the resources allocated by the access device to the user comprise: IP address, and start time and stop time of network access, as well as bandwidth (optional). The user's network resource information recorded by AAA server comprises: user's account number, start time and stop time of network access, IP address, network access location, and service attribute.

In step (2) of the method, the network usage information recorded by the router comprises: source IP address, destination IP address, source port number, destination port number, number of bytes, and timestamp.

The association analysis in step (4) of the method is: matching the IP address and start time and stop time of network access in the user's network resource information to the IP address and timestamp in the network usage information, to determine the user

corresponding to the network usage information.

The advantage of the method for collecting network usage data of a user according to the present invention is: it will not affect network usage for the user; in addition, due to the advanced design of NetStream, the method will not degrade IP message forwarding rate; instead, it may speed up the forwarding rate in certain cases. Through aggregation, association, and analysis, the method associates isolated network usage information with user's network resource information uploaded from the AAA server organically, so that it can collect user's network resource usage information in real time and record accurately user access to websites (IP addresses), services (port numbers), and duration and traffic in a certain time period. Furthermore, the network usage information collected with this method is comprehensive, and the data is compact through aggregation; thus the method will not occupy vast storage resource. The final network usage data created with this method may be oriented to users directly, to meet the data demand of diverse applications, such as content accounting, destination IP accounting, real-time accounting, network monitoring, and user behavior analysis. In addition, the method is advantageous in real-time feature and can meet the real-time demand of the majority of applications.

Brief Description of the Drawings

Fig. 1 is the networking diagram of the commonly used method for collecting network usage data presently;

Fig.2 is the networking diagram of the method for collecting network usage data of a user according to the present invention.

Detailed Description of the Embodiments

The present invention employs the networking solution as shown in Fig.2. Firstly, the access device authenticates and authorizes the user, and the AAA server records the user's network resource information authenticated and authorized; during network access, the router records network usage information and sends the network usage information to NSC with UDP messages; the NSC aggregates the collected network usage information; the association analysis server performs real-time association analysis for the aggregated network usage information and the user's network resource information uploaded from the AAA server to obtain detailed network usage data of the user.

The access device in the method may be any one of LAN switch, access server, or IP phone gateway.

In the method, the process in which an access device authenticates and authorizes the user and an AAA server records the user's network resource information is as follows: firstly, the access device sends the user's authentication and authorization data to the AAA server; the AAA server analyzes and records the user's authentication and authorization data, and sends the network access control information to the access device; the access device allocates resources to the user and sends the user's network resource information to the AAA server, which records the user's network resource information; the AAA server forwards the user's network resource information to the association analysis server in real time. Wherein, the resources allocated by the access device to the user comprise: IP address, and start time and stop time of network access, as well as bandwidth (optional). The user's network resource information recorded by AAA server comprises: user's account number, start time and stop time of network access, IP address, network access location, and service attribute.

In the method, the network usage information recorded by the router comprises: source IP address, destination IP address, source port number, destination port number, number of bytes, and timestamp.

The association analysis in the method comprises matching the IP address and the start time and stop time of network access in the user's network resource information to the IP address and the timestamp in the network usage information, to determine the user corresponding to the network usage information.